Y/SUB/08-063119/2

BWXT Y-12
Protecting America's Future

Y-12 NATIONAL SECURITY COMPLEX

Y-12 GROUNDWATER PROTECTION PROGRAM GROUNDWATER AND SURFACE WATER SAMPLING AND ANALYSIS PLAN FOR CALENDAR YEAR 2009

December 2008

Prepared by

Elvado Environmental LLC
Under Subcontract No. 4300063119

for the

Environmental Compliance Department
Environment, Safety, and Health Division
Y-12 National Security Complex
Oak Ridge, Tennessee 37831

Managed by

Babcock & Wilcox Technical Services Y-12, LLC
for the U.S. DEPARTMENT OF ENERGY
under contract No. DE-AC05-00OR22800

MANAGED BY
BWXT Y-12, L.L.C.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

UCN-13672 (11-03)

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TABLE OF CONTENTS

Section Page

List of Figures iii

List of Tables iii

List of Acronyms and Abbreviations iv

1.0 INTRODUCTION 1

2.0 MONITORING LOCATIONS 3

3.0 FIELD MEASUREMENTS AND ANALYTICAL PARAMETERS 5

4.0 SAMPLE PLANNING, COLLECTION, AND HANDLING 7

5.0 REFERENCES 11

APPENDICES:

A FIGURES
B TABLES
C CY 2009 GROUNDWATER MONITORING SCHEDULES
D ADDENDA TO THE CY 2009 SAMPLING AND ANALYSIS PLAN
E LABORATORY REQUIREMENTS
(Bottle Lists, Holding Times, Turnaround Times, Elevated Minimum Detectable Activity)
F SAMPLING FREQUENCIES FOR MONITORING WELLS DURING CY 2009
G MANAGEMENT OF PURGED GROUNDWATER

List of Figures

Figure		Page
A.1	Hydrogeologic regimes at the Y-12 National Security Complex	A-1
A.2	CY 2009 sampling locations in the Bear Creek Hydrogeologic Regime	A-2
A.3	CY 2009 sampling locations in the Chestnut Ridge Hydrogeologic Regime	A-3
A.4	CY 2009 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime	A-4
A.5	CY 2009 surface water sampling locations north of Pine Ridge	A-5
A.6	Westbay™ monitoring system sampling port depths in well GW-726	A-6
A.7	Westbay™ monitoring system sampling port depths in well GW-722	A-7

List of Tables

Table		Page
B.1	Sampling locations, frequency, and analytical parameters for groundwater and surface water monitoring during CY 2009	B-1
B.2	Field measurements and analytes that comprise the elementary parameter groups for CY 2009 groundwater and surface water samples	B-7

List of Acronyms and Abbreviations

ACO	Analytical Chemistry Organization
Bear Creek Regime	Bear Creek Hydrogeologic Regime
BWXT	BWXT Y-12, L.L.C.
Chestnut Ridge Regime	Chestnut Ridge Hydrogeologic Regime
CY	calendar year
DOE	U.S. Department of Energy
East Fork Regime	Upper East Fork Poplar Creek Hydrogeologic Regime
EPA	U.S. Environmental Protection Agency
GWPP	Groundwater Protection Program
GWMS	Groundwater Monitoring Schedule
MAROS	Monitoring and Remediation Optimization System
PDB	passive diffusion bag (sampler)
REDOX	oxidation-reduction potential
VOCs	volatile organic compounds
Y-12	Y-12 National Security Complex

1.0 INTRODUCTION

This plan provides a description of the groundwater and surface water quality monitoring activities planned for calendar year (CY) 2009 at the U.S. Department of Energy (DOE) Y-12 National Security Complex (Y-12) that will be managed by the Y-12 Groundwater Protection Program (GWPP). Groundwater and surface water monitoring performed by the GWPP during CY 2009 will be in accordance with DOE Order 540.1 requirements and the following goals:

- to protect the worker, the public, and the environment;
- to maintain surveillance of existing and potential groundwater contamination sources;
- to provide for the early detection of groundwater contamination and determine the quality of groundwater and surface water where contaminants are most likely to migrate beyond the Oak Ridge Reservation property line;
- to identify and characterize long-term trends in groundwater quality at Y-12; and
- to provide data to support decisions concerning the management and protection of groundwater resources.

Groundwater and surface water monitoring during CY 2009 will be performed primarily in three hydrogeologic regimes at Y-12: the Bear Creek Hydrogeologic Regime (Bear Creek Regime), the Upper East Fork Poplar Creek Hydrogeologic Regime (East Fork Regime), and the Chestnut Ridge Hydrogeologic Regime (Chestnut Ridge Regime). The Bear Creek and East Fork regimes are located in Bear Creek Valley, and the Chestnut Ridge Regime is located south of Y-12 (Figure A.1). Additional surface water monitoring will be performed north of Pine Ridge, along the boundary of the Oak Ridge Reservation.

Modifications to the CY 2009 monitoring program may be necessary during implementation. Changes in programmatic requirements may alter the analytes specified for selected monitoring wells or may add or remove wells from the planned monitoring network. All modifications to the monitoring program will be approved by the Y-12 GWPP manager and documented as addenda to this sampling and analysis plan.

The following sections of this report provide details regarding the CY 2009 groundwater and surface water monitoring activities. Section 2 describes the monitoring locations in each regime and the processes used to select the sampling locations. A description of the field measurements and laboratory analytes is provided in Section 3; sample collection methods and procedures are described in Section 4; and Section 5 lists the documents cited for more detailed operational and technical information.

The narrative sections of the report reference several appendices. Figures (maps and diagrams) and tables (excluding data summary tables presented in the narrative sections) are in Appendix A and Appendix B, respectively. Groundwater Monitoring Schedules (when issued throughout CY 2009) will be inserted in Appendix C, and addenda to this plan (if issued) will be inserted in Appendix D. Laboratory requirements (bottle lists, holding times, etc.) are provided in Appendix E. The updated sampling frequency for each monitoring well to be sampled during CY 2009 is in Appendix F, and an approved Waste Management Plan is provided in Appendix G.

2.0 MONITORING LOCATIONS

The monitoring locations to be sampled by the Y-12 GWPP during CY 2009 (Table B.1) were selected based on results of a supplemental comprehensive assessment of the Y-12 GWPP using the Monitoring and Remediation Optimization System (MAROS) software (Babcock & Wilcox Technical Services Y-12, LLC 2008). The MAROS assessment provided recommendations (e.g., sampling locations and frequencies) for the active monitoring locations defined the Y-12 GWPP monitoring optimization plan (BWXT 2006a). The monitoring wells selected for sample collection in CY 2009 include semiannual, annual, biennial, and pentennial (once every five years) sampling frequencies (Appendix F). The final sampling frequencies for CY 2009 reflect results of a detailed evaluation of the MAROS recommendations by Y-12 GWPP staff. In addition to the final sampling frequency for each location, Appendix F contains the sampling frequencies presented in the baseline MAROS assessment (BWXT 2005), the Y-12 GWPP monitoring optimization plan, and the supplemental MAROS assessment.

The Y-12 GWPP monitoring network for CY 2009 includes 116 monitoring locations (Table B.1): 44 located in the Bear Creek Regime (Figure A.2), 10 located in the Chestnut Ridge Regime (Figure A.3), 62 located in the East Fork Regime (Figure A.4), and three located north of Pine Ridge (Figure A.5). Groundwater samples will be collected from a total of 104 monitoring wells, including 38 wells in the Bear Creek Regime (Figure A.2), five wells in the Chestnut Ridge Regime, and 61 wells in the East Fork Regime (Figure A.4). Two of these wells contain a Westbay™ multiport sampling system that allows collection of groundwater samples from several discrete depth intervals (Table B.1). Well GW-726 , located in the Bear Creek Regime, will have samples collected from eight ports (Figure A.6) and well GW-722, located in the East Fork Regime, will have samples collected from five ports (Figure A.7). Samples of groundwater discharging from five natural springs will be collected during CY 2009, including two springs (SS-4 and SS-5) in the Bear Creek Regime (Figure A.2), two springs (SCR2.1SP and SCR2.2SP) in the Chestnut Ridge Regime (Figure A.3), and one spring (SP-17) in the East Fork Regime (Figure A.4).

Surface water samples will be collected from a total of 10 sampling locations during CY 2009, including four locations in the Bear Creek Regime, three locations in the Chestnut Ridge Regime, and three locations north of Pine Ridge. In the Bear Creek Regime, samples will be collected from three stations in the main channel of Bear Creek (BCK-04.55, BCK-09.40, and BCK-11.97) and from one station along a northern tributary (NT-01) to Bear Creek (Figure A.2). The tributaries located in the Chestnut Ridge Regime have been numbered from west to east (SCR1 through SCR5) and surface water samples will be collected from three of the tributaries at stations (SCR1.5SW, SCR3.5SW, and S17 [located in SCR5]) located along the north side of Bethel Valley Road (Figure A.3). The surface water sampling locations north of Pine Ridge (Figure A.5) include a tributary near the Scarboro Community (NPR12.0SW), a tributary to Mill Branch (NPR23.0SW), and Gum Hollow Branch near Country Club Estates (GHK2.51ESW).

3.0 FIELD MEASUREMENTS AND ANALYTICAL PARAMETERS

Before collecting samples at each monitoring location, field personnel will record (on Field Data Sheets) field measurements (Table B.2), including:

- depth to the static water level in monitoring wells;
- pH;
- water temperature;
- conductivity;
- dissolved oxygen; and
- oxidation-reduction potential (REDOX)

Field measurement of dissolved oxygen and REDOX will not be obtained for sampling ports of monitoring wells equipped with a Westbay™ multiport sampling system. Instead of measuring the depth to the static water level in each Westbay™ sampling zone, the potentiometric head (in ft) will be calculated from subsurface pressure measurements obtained.

For this Sampling and Analysis Plan, specific analytes are grouped by analytical method or by type (e.g., trace metals) and referenced as elementary parameter groups (Table B.1 and Table B.2). In addition to field measurements, most of the groundwater and surface water samples will be analyzed for the following suite of parameters (identified as the Standard Administrative Parameter Group):

- miscellaneous laboratory analytes (total suspended solids and total dissolved solids);
- major anions;
- trace metals (includes major cations);
- a comprehensive suite of volatile organic compounds (VOCs); and
- gross alpha and gross beta activity.

Beginning in CY 2009, selective parameter monitoring (SPM) will be performed on samples from monitoring wells with analytical results for at least eight samples obtained since January 1991. Historical data must clearly demonstrate that the selected parameters are the contaminants of concern and provide sufficient data for the other parameters without additional analyses. For example, samples from 35 monitoring wells will be analyzed only for VOCs (Table B.1), and historical data for these locations show consistently low results for inorganic and radiochemical analytes. The SPM elementary parameter groups reflect analytical methods (Table B.2) and are designed to obtain the data necessary to meet requirements of the GWPP monitoring program.

Samples from selected locations will be analyzed for specific radionuclides. The radionuclide analyses will supplement gross alpha and/or gross beta activity results, especially in cases where the gross activity reporting limits are elevated from interferences caused by a high dissolved solid content of the groundwater sample (see Appendix E).

4.0 SAMPLE PLANNING, COLLECTION, AND HANDLING

The monitoring locations to be sampled during CY 2009 are grouped by hydrogeologic regime to provide geographic areas for planning and tracking purposes. The CY quarter for sample collection at each monitoring location is provided in Table B.1.

A Groundwater Monitoring Schedule (GWMS) will be prepared by GWPP personnel for each sampling event of CY 2009. Each GWMS (four per year) will be issued before sample collection begins, will specify the sequence for collecting samples from the monitoring locations scheduled, and will include information necessary for field personnel to collect the required samples (e.g., containment requirements and previous pumping rates used to sample each well). The GWMS is an integral part of this document, and when issued, the GWMS for each CY 2009 sampling event is to be inserted (Appendix C) by the recipient.

Unfiltered samples will be collected semiannually (24 samples) or annually (118 samples, including 24 biennial and nine pentennial samples) from the monitoring locations during CY 2009. As summarized below, the number of samples to be collected during each CY quarter will range from 26 to 42, for an annual total of 142 samples.

HYDROGEOLOGIC REGIME/AREA	NUMBER OF SAMPLES PER QUARTER OF CY 2009			
	1st	2nd	3rd	4th
Bear Creek Regime	32	8	16	0
Chestnut Ridge Regime	0	0	0	10
East Fork Regime	0	31	26	16
North of Pine Ridge	3	0	0	0
TOTAL:	**35**	**39**	**42**	**26**

Personnel from the Environmental Sampling Section of the Y-12 Environment Compliance Department will be responsible for collection, transportation, and chain-of-custody control of all groundwater and surface water samples. Based on the analytical parameters for the CY 2009 monitoring locations (Table B.1 and Table B.2), personnel with the Y-12 Analytical Chemistry Organization (ACO) will prepare bottle lists that specify the sample container type, size, preservative, and the laboratory test identification needed for each sampling location (see Appendix E). Additionally, ACO personnel will generate a weekly tracking report to record the sample collection date and time for each monitoring location, the date that analyses are scheduled for completion, or when analyses are completed. Sample collection will be performed in accordance with the most recent version of operating procedures for obtaining groundwater samples (BWXT 2002a, BWXT 2004, BWXT 2006b, and BWXT 2007b) and surface water samples (BWXT 2002b). All field and laboratory activities will be performed in accordance with applicable requirements of the Y-12 Integrated Safety Management System and task-specific job hazard analyses.

Groundwater samples will be collected using the low-flow minimal drawdown method (low-flow method) during CY 2009 from most of the monitoring wells (Table B.1). A passive (no purging) sampling method will be used to collect samples at selected monitoring wells either by collecting a sample using the dedicated pump without purging (three wells) or by using a passive diffusion bag (PDB) sampler (31 wells). Additionally, groundwater samples from two wells (GW-722 and GW-726) that are equipped with a Westbay™ multiport sampling system will be collected following applicable procedures.

For the low-flow method, a bladder pump is permanently installed in each well that is scheduled for sample collection. If well construction prevents permanent installation (e.g., flush-mounted wells), then the pump and tubing will be installed at least 24 hours before sample collection and will be removed when sampling is completed. In accordance with the groundwater sampling procedure for the low-flow method (BWXT 2007b), groundwater is purged, and subsequently sampled, from the well at a flow rate (<300 milliliters per minute[ml/min]) which ensures minimal drawdown of the static water level, therefore isolating the stagnant water column above the intake of the pump. Groundwater samples are collected from a well after the water level is in steady-state drawdown (<0.1 ft over a 15-minute interval) and field parameters (pH, conductivity, water temperature, REDOX, and dissolved oxygen) have stabilized (minimal variation over four consecutive readings).

A "no-purge method" will be used for wells with low-flow sampling histories that demonstrate very low pumping rate (<50 ml/min) to meet the minimal drawdown requirement during purging and sample collection. For this method, field measurements will be obtained and groundwater samples will be collected after pumping the stagnant water (calculated volume) from the tubing. During CY 2009, the no-purge method will be used to collect groundwater samples from two wells (GW-065 and GW-623) in the Bear Creek Regime and one well (56-4A) in the East Fork Regime (Table B.1)

Passive diffusion bag (PDB) samplers will be used to evaluate VOC concentrations at 31 of the wells selected for VOC analyses only, including nine wells in the Bear Creek Regime, five wells in the Chestnut Ridge Regime, and 17 wells in the East Fork Regime (Table B.1). A PDB is polyethylene bag (semipermeable membrane) that is filled with deionized water, lowered to the monitored interval of the well, and remains in the well for at least two weeks to allow VOC concentrations in the bag to reach equilibrium (passive diffusion) with the surrounding groundwater. After retrieval, sample bottles for VOC analyses will be filled with water from the PDB.

Groundwater sampling and pressure profiling using a Westbay™ multiport sampling system at wells GW-726 (Figure A.6) in the Bear Creek Regime and GW-722 (Figure A.6) in the East Fork Regime will be performed in accordance with the operating procedures (BWXT 2002a and BWXT 2006b). The groundwater samples from each sampling port will be collected in 250-milliliter nonvented stainless steel Westbay™ sample collection bottles filled at the designated depth in the well. Once filled, the bottles will be raised to the surface and the groundwater will be transferred to laboratory sample containers. The sample collection bottles will be lowered, filled, and retrieved as many times as needed to completely fill the laboratory sample bottles. Groundwater in the first sample collection bottles retrieved from each sampling port will be used as a "formation rinse" to obtain field measurements and to condition the sample collection bottle for each zone.

In addition to the groundwater and surface water samples, field blanks and equipment rinsate samples will be collected at the frequencies and analyzed for the parameter groups specified on Table B.1. Field blank samples will be collected for at least 1% of the samples. Therefore, two field blank samples will be collected during CY 2009: in the Bear Creek Regime during the first quarter and in the East Fork Regime during the third quarter. An equipment rinsate sample will be collected from Westbay well GW-722 (Table B.1) immediately after field-cleaning the sampling equipment used to collect samples from the last sampling port (GW-722-17).

Trip blank samples and field duplicate samples will be prepared and handled in accordance with the *Field Quality Control Samples* operating procedure (BWXT 2007c) and will be analyzed using applicable procedures. Trip blank samples will be prepared for each cooler used to transport samples for volatile organic analyses. Because duplicate samples will be collected from at least 10% of the sampling locations, a total

of 15 field duplicate samples will be collected during CY 2009: six in the Bear Creek Regime, one in the Chestnut Ridge Regime, and eight in the East Fork Regime (Table B.1).

All groundwater and surface water samples will be relinquished under chain-of-custody control to the appropriate Y-12 ACO laboratory that will perform the analyses. The Y-12 ACO laboratories will perform each analyses within established holding times and deliver results in hard copy and electronic format within established turnaround times (see Appendix E).

5.0 REFERENCES

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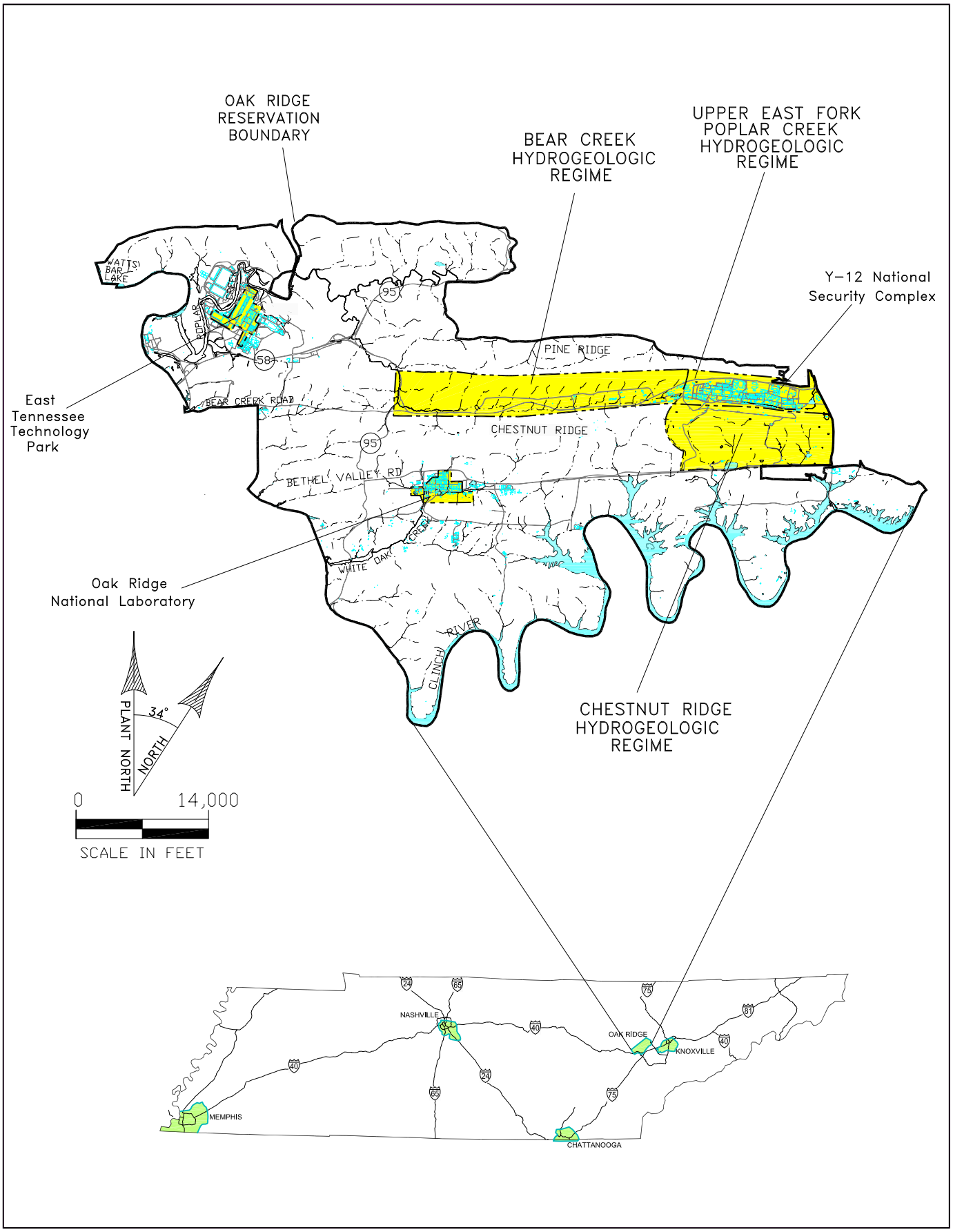
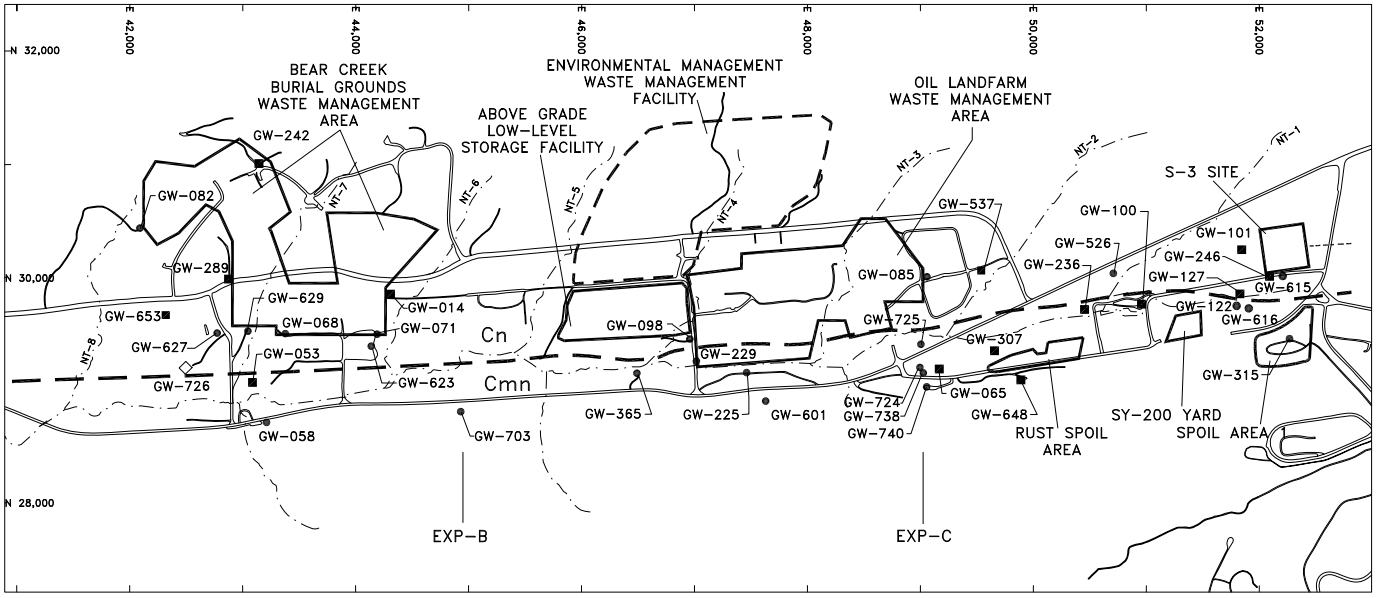
APPENDIX A

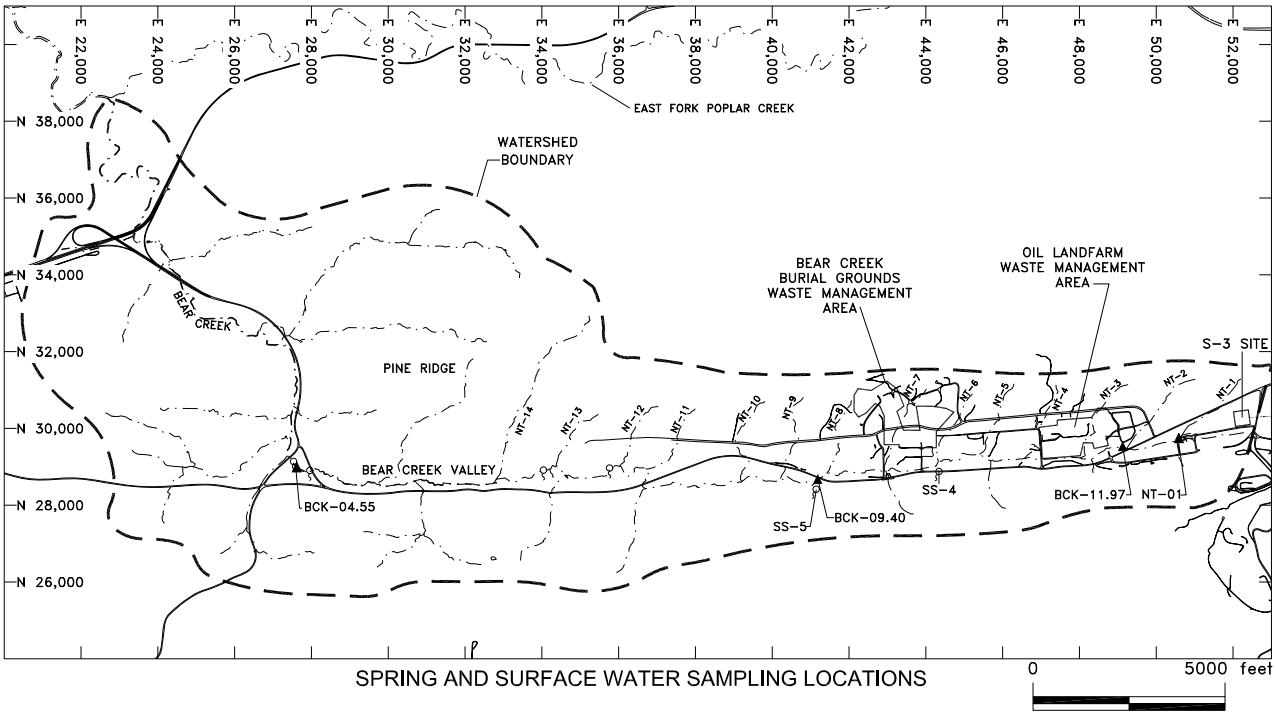
FIGURES



GWPP Fig1 09/23/08

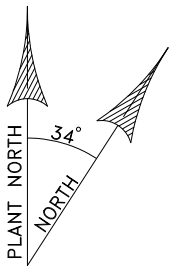
Fig. A.1. Hydrogeologic regimes at the Y-12 National Security Complex.





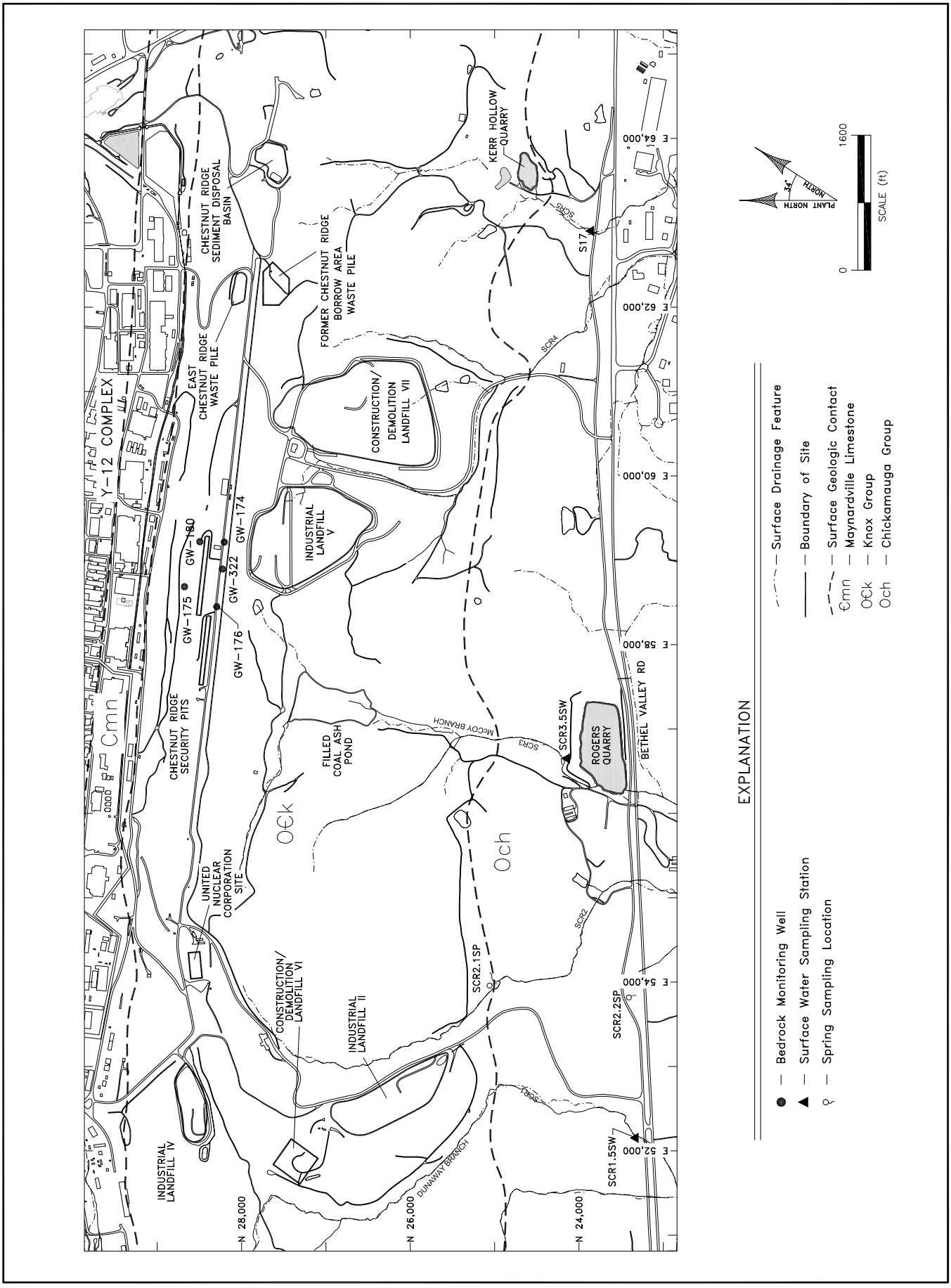
EXPLANATION

- ■ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ◇ — Well With Westbay Multiport Sampling System
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- EXP-C — Exit Pathway, Maynardville Limestone Picket
- — · — · — — Surface Drainage Feature
- NT-5 — North Tributary
- Cn — Nolichucky Shale
- — — — Approximate Geologic Contact
- Cmn — Maynardville Limestone



SAP09_2 09/18/08

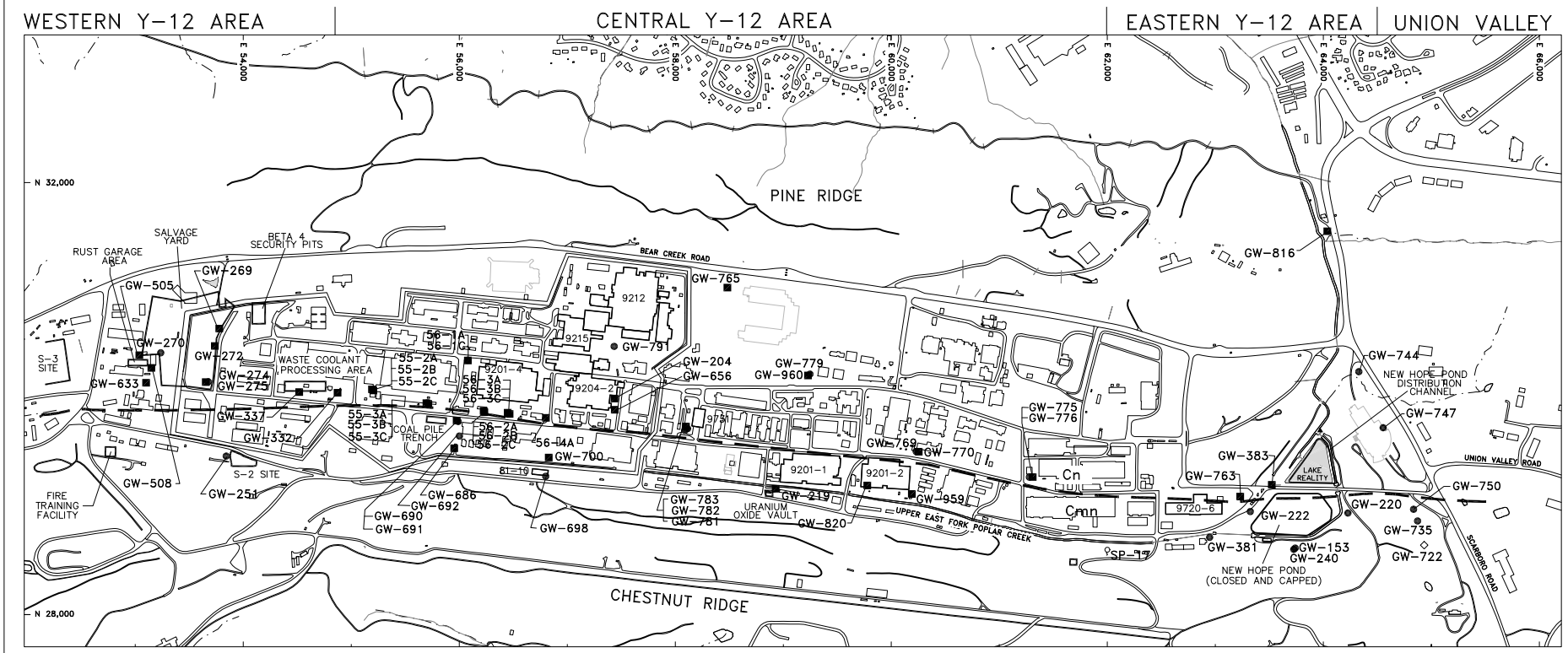
Fig. A.2. CY 2009 sampling locations in the Bear Creek Hydrogeologic Regime.



SAP09_3 09/24/08

Fig. A.3. CY 2009 sampling locations in the Chestnut Ridge Hydrogeologic Regime.

SAP09_4 12/02/08



EXPLANATION

- ■ — Water Table Monitoring Well
- ● — Bedrock Monitoring Well
- ◇ — Well With Westbay Multiport Sampling System
- ▲ — Surface Water Sampling Station
- ♀ — Spring Sampling Station
- Cn — Nolichucky Shale
- — — — Approximate Geologic Contact
- Cmn — Maynardville Limestone

Fig. A.4. CY 2009 sampling locations in the Upper East Fork Poplar Creek Hydrogeologic Regime.

SAP09_5 12/03/08

Fig. A.5. CY 2009 surface water sampling locations north of Pine Ridge.

APPENDIX B

TABLES

Table B.1 Sampling locations, frequency, and analytical parameters for groundwater and surface water monitoring during CY 2009

Sampling Point [1]	Location [2]	Collection Method [3]	Tag Depth [4]	Samples Collected in CY 2009 [5]				Parameters [6]
				Q1	Q2	Q3	Q4	
Bear Creek Hydrogeologic Regime								
GW-014	BG	LFLO	14.50	Y				VOC(1)
GW-053	BG	PDB	35.13	**D**				VOC-PDB
GW-058	BG	LFLO	48.90	Y				STD
GW-065	OLF	NP	36.89	Y		Y		STD
GW-068	BG	LFLO	86.10	Y				STD
GW-071	BG	LFLO	218.40	Y		Y		MET-PMS, VOC(1)
GW-082	BG	LFLO	38.45			Y		VOC(1)
GW-085	OLF	LFLO	62.34	**D**				Anions, RAD(1,12)
GW-098	OLF	PDB	105.65	Y				VOC-PDB
GW-100	S3	LFLO	17.87	Y				STD
GW-101	S3	LFLO	19.18	Y				STD
GW-122	S3	LFLO	145.28	Y				STD
GW-127	S3	LFLO	26.52	Y				STD
GW-225	OLF	LFLO	203.30	Y				Anions, VOC(1)
GW-229	OLF	LFLO	51.45	Y				STD
GW-236	S3	LFLO	21.14	Y				STD
GW-242	BG	LFLO	20.18	Y				STD
GW-246	S3	LFLO	76.50			Y		STD
GW-289	BG	PDB	43.14			**D**		VOC-PDB
GW-307	RS	LFLO	43.60	**D**				STD
GW-315	SPI	PDB	105.98	Y				VOC-PDB
GW-365	OLF	PDB	152.49	Y				VOC-PDB
GW-526	S3	LFLO	123.80	Y				Anions, RAD(1,12)
GW-537	OLF	LFLO	27.35			Y		Anions, RAD(1,12)
GW-601	OLF	LFLO	358.61	Y				Anions, VOC(1)
GW-615	S3	LFLO	246.84	Y				STD
GW-616	S3	LFLO	270.59			Y		Anions
FB-GW-623	BG	.	.	Y				VOC(1)
GW-623	BG	NP	277.93	Y				STD
GW-627	BG	PDB	270.96	Y		Y		VOC-PDB
GW-629	BG	PDB	314.59	Y		Y		VOC-PDB
GW-648	RS	LFLO	82.47	**D**		Y		STD
GW-653	BG	PDB	41.53	Y				VOC-PDB
GW-703	EXP-B	LFLO	185.29	Y				STD
GW-724	EXP-C	LFLO	293.60	Y				Anions, VOC(1)
GW-725	EXP-C	LFLO	145.42	Y				STD
GW-726-02	BG	WBAY	581.00		Y			STD
GW-726-04	BG	WBAY	546.00		Y			STD
GW-726-06	BG	WBAY	511.00		Y			STD
GW-726-09	BG	WBAY	441.00		Y			STD
GW-726-12	BG	WBAY	376.00		Y			STD
GW-726-16	BG	WBAY	291.00		Y			STD
GW-726-20	BG	WBAY	200.00		Y			STD
ER-GW-722-23	BG	.	.		Y			VOC(1)
GW-726-23	BG	WBAY	130.00		Y			STD
GW-738	EXP-C	LFLO	91.78	Y				STD
GW-740	EXP-C	PDB	192.67	Y				VOC-PDB

Table B.1 (continued)

Sampling Point [1]	Location [2]	Collection Method [3]	Tag Depth [4]	Samples Collected in CY 2009 [5]				Parameters [6]
				Q1	Q2	Q3	Q4	
Bear Creek Hydrogeologic Regime (continued)								
BCK-04.55	EXP-SW	GRAB	.			Y		STD
BCK-09.40	EXP-SW	GRAB	.			**D**		STD
BCK-11.97	EXP-SW	GRAB	.			Y		STD
NT-01	EXP-SW	GRAB	.			Y		STD
SS-4	EXP-SW	GRAB	.			Y		STD
SS-5	EXP-SW	GRAB	.			Y		STD
Chestnut Ridge Hydrogeologic Regime								
GW-174	CRSP	PDB	151.94				Y	VOC-PDB
GW-175	CRSP	PDB	169.49				Y	VOC-PDB
GW-176	CRSP	PDB	147.33				**D**	VOC-PDB
GW-180	CRSP	PDB	146.08				Y	VOC-PDB
GW-322	CRSP	PDB	191.99				Y	VOC-PDB
S17	EXP-SW	GRAB	.				Y	STD
SCR1.5SW	EXP-SW	GRAB	.				Y	STD
SCR2.1SP	EXP-SW	GRAB	.				Y	STD
SCR2.2SP	EXP-SW	GRAB	.				Y	STD
SCR3.5SW	EXP-SW	GRAB	.				Y	STD
Upper East Fork Poplar Creek Hydrogeologic Regime								
55-2A	GRIDB3	LFLO	13.98				Y	Anions, VOC(1)
55-2B	GRIDB3	LFLO	27.69				Y	STD
55-2C	GRIDB3	LFLO	76.00				Y	Anions, VOC(1)
55-3A	B9201-5	LFLO	14.25		Y		Y	STD
55-3B	B9201-5	LFLO	37.98		Y		Y	STD
55-3C	B9201-5	LFLO	77.43		Y		Y	STD
56-1A	Y12	LFLO	18.95			Y		STD
56-1C	Y12	LFLO	73.45			**D**		STD
56-2A	GRIDC3	LFLO	15.03			Y		STD
56-2B	GRIDC3	LFLO	38.63			Y		STD
56-2C	GRIDC3	PDB	77.03			Y		VOC-PDB
56-3A	Y12	LFLO	17.92			Y		STD
56-3B	Y12	LFLO	30.85			Y		STD
FB-56-3C	Y12	.	.			Y		VOC(1)
56-3C	Y12	LFLO	55.35			Y		STD
56-4A	Y12	NP	12.60		Y			STD
GW-153	NHP	PDB	60.84				**D**	VOC-PDB
GW-204	T0134	LFLO	20.23		Y			MET-PMS, RAD(1,3)
GW-219	UOV	LFLO	15.59		Y			MET-PMS, RAD(1,3)
GW-220	NHP	PDB	49.00		Y		Y	VOC-PDB
GW-222	NHP	LFLO	28.55		**D**			STD
GW-240	NHP	PDB	32.55				Y	VOC-PDB
GW-251	S2	LFLO	50.04		Y			STD
GW-269	SY	PDB	33.50		Y			VOC-PDB
GW-270	SY	LFLO	21.50		Y			STD
GW-272	SY	LFLO	19.16		Y			STD
GW-274	SY	LFLO	36.12		**D**			STD
GW-275	SY	LFLO	68.47		Y			STD

Table B.1 (continued)

Sampling Point [1]	Location [2]	Collection Method [3]	Tag Depth [4]	Samples Collected in CY 2009 [5]				Parameters [6]
				Q1	Q2	Q3	Q4	
Upper East Fork Poplar Creek Hydrogeologic Regime (continued)								
GW-332	WC	PDB	27.07		Y			VOC-PDB
GW-337	WC	PDB	25.33		Y			VOC-PDB
GW-381	NHP	LFLO	61.01				Y	VOC(1)
GW-383	NHP	PDB	26.54				Y	VOC-PDB
GW-505	RG	LFLO	16.80		**D**			MET-PMS, RAD(1)
GW-508	RG	PDB	15.11		Y			VOC-PDB
GW-633	RG	LFLO	15.15		Y			STD
GW-656	T0134	PDB	20.60		Y			VOC-PDB
GW-686	CPT	LFLO	16.23		Y			Anions, HG, VOC(1)
GW-690	CPT	LFLO	53.25		Y			Anions, HG, VOC(1)
GW-691	CPT	LFLO	20.39		Y		**D**	Anions, HG, VOC(1)
GW-692	CPT	LFLO	53.05		Y			Anions, HG, VOC(1)
GW-698	B8110	LFLO	74.88		**D**		Y	Anions, HG, VOC(1)
GW-700	B8110	PDB	33.19			Y		VOC-PDB
GW-722-14	EXP-J	WBAY	425.00			Y		STD
GW-722-17	EXP-J	WBAY	385.00			Y		STD
ER-GW-722-17	EXP-J	.	.			Y		VOC(1)
GW-722-20	EXP-J	WBAY	333.00			Y		STD
GW-722-22	EXP-J	WBAY	313.00			Y		STD
GW-722-33	EXP-J	WBAY	87.00			Y		STD
GW-735	EXP-J	LFLO	81.81			Y		STD
GW-744	GRIDK1	LFLO	69.28			Y		STD
GW-747	GRIDK2	LFLO	82.33			Y		STD
GW-750	EXP-J	LFLO	75.49		Y			STD
GW-763	GRIDJ3	LFLO	20.41				Y	VOC(1)
GW-765	GRIDE1	LFLO	35.05		Y			STD
GW-769	GRIDG3	PDB	62.73		Y		Y	VOC-PDB
GW-770	GRIDG3	PDB	21.68				Y	VOC-PDB
GW-775	GRIDH3	PDB	55.98			Y		VOC-PDB
GW-776	GRIDH3	LFLO	21.92			Y		STD
GW-779	GRIDF2	LFLO	65.35			Y		STD
GW-781	GRIDE3	LFLO	71.07			Y		STD
GW-782	GRIDE3	LFLO	38.23			Y		STD
GW-783	GRIDE3	PDB	17.98			Y		VOC-PDB
GW-791	GRIDD2	PDB	72.45			Y		VOC-PDB
GW-816	EXP-SR	LFLO	17.99			Y		STD
GW-820	B9201-2	PDB	17.18		Y			VOC-PDB
GW-959	B9201-2	LFLO	.		Y			STD
GW-960	GRIDF2	LFLO	.		Y			STD
SP17	EXP-SW	GRAB	.			**D**		STD
GHK2.51WSW	EXP-SW	GRAB	.	Y				STD
NPR12.0SW	EXP-SW	GRAB	.	Y				STD
NPR23.0SW	EXP-SW	GRAB	.	Y				STD

Table B.1 (continued)

Notes:

1
- BCK - Bear Creek Kilometer (surface water station)
- ER - Equipment rinsate sample
- FB - Field blank sample
- GW - Groundwater monitoring well
- GHK - Gum Hollow Kilometer (surface water station)
- NPR - North of Pine Ridge (surface water station)
- NT - North Tributary to Bear Creek (surface water station)
- S17 - Surface water station in SCR5
- SCR - South Chestnut Ridge (spring or surface water station)
- SP17 - Spring sampling location: Eastern Y-12 Area
- SS - Spring sampling location: South Side of Bear Creek

2
- B8110 - Building 81-10
- B9201-2 - Building 9201-2
- B9201-5 - Building 9201-5
- BG - Bear Creek Burial Grounds Waste Management Area
- CPT - Coal Pile Trench
- CRSP - Chestnut Ridge Security Pits
- EXP-B - Exit Pathway Picket B
- EXP-C - Exit Pathway Picket C
- EXP-J - Maynardville Limestone Exit Pathway Picket J
- EXP-NPR - Surface water sampling station located where drainage exits the Oak Ridge Reservation, north of Pine Ridge
- EXP-SR - Exit pathway well in the gap through Pine Ridge along Scarboro Road
- EXP-SW - Spring or Surface Water Location
- GRID - Comprehensive Groundwater Monitoring Plan Grid Location
- NHP - New Hope Pond
- OLF - Oil Landfarm Waste Management Area
- RG - Rust Garage Area
- RS - Rust Spoil Area
- S2 - S-2 Site
- S3 - S3 Site
- SPI - Spoil Area I
- SY - Y-12 Salvage Yard
- T0134 - Underground Storage Tank 0134-U
- UOV - Uranium Oxide Vault
- WCPA - Waste Coolant Processing Area
- Y12 - Y-12 Complex

3 Sample Collection Method
- LFOW - Low-flow minimal purge
- NP - No purge before sample collection; history of very low sampling rate (<50 ml/min)
- PDB - Passive diffusion bag
- GRAB - Surface water sample, grab sample
- WBAY - Westbay multiport method

4 Tag Depth:

The distance measured (in ft) from the top of the well casing to the bottom of the well, as recorded during well inspections.

For wells GW-722 and GW-726, the depth (below the top of well casing) of the sampling port.

Table B.1 (continued)

Notes: (continued)

5 Details regarding the monitoring frequency for each location is provided in Appendix F. Groundwater Monitoring Schedules (Appendix C) provide the sequence for collecting samples during each quarterly sampling event and includes the waste stream identification for groundwater purged from each monitoring well. The Waste Management Plan for sampling activities is in Appendix G.

Y - Sample collection will be performed during the CY 2009 quarter
D - A field duplicate sample will collected in addition to the regular sample

6 Table B.2 provides a comprehensive list of analytes, analytical methods, and the associated parameter group.

STD - Standard administrative parameter group, including all of the analytes in the following elementary parameter groups:

FLD - Field measurements
CHEM - Miscellaneous laboratory analytes (e.g., dissolved solids) and anions
MET(1) - Metals
VOC(1) - Volatile organic compounds
RAD(1) - Gross alpha and gross beta activity

Selective Parameter Monitoring: (Field measurements will be obtained at all locations)

Anions - Chloride, Nitrate, and Sulfate
HG - Mercury
MET-ICP - Metals by method SW846-6010B
MET-PMS - Metals by method SW846-6020
VOC-PDB - Volatile organic compounds reported for Passive Diffusion Bag samples; a subset of the VOC(1) group
RAD(3) - Uranium-234, -235, and -238
RAD(12) - Technetium-99

Table B.2 Field measurements and laboratory analytes that comprise the elementary parameter groups for CY 2009 groundwater and surface water samples

Parameter Group [1]		Measurement or Analyte	Analytical Method [2]	Reporting Limit [3]	Units [4]
FLD		Depth to Water	NA	NA	ft
		Water Temperature	NA	NA	centigrade
		pH	NA	NA	pH units
		Conductivity	NA	NA	µmho/cm
		Dissolved Oxygen	NA	NA	ppm
		Oxidation-Reduction Potential (REDOX)	NA	NA	mV
CHEM	TDS	Total Dissolved Solids	SM 2540C 18	1	mg/L
	TSS	Total Suspended Solids	SM 2540D 18	1	mg/L
	Alkalinity	Bicarbonate	SM 2320B 18	1	mg/L
		Carbonate	SM 2320B 18	1	mg/L
	Anions	Chloride	SW846-9056	0.2	mg/L
		Nitrate (as Nitrogen)	EPA-353.2	0.05	mg/L
		Sulfate	SW846-9056	0.25	mg/L
	Fluoride	Fluoride	SM 4500F 18	0.1	mg/L
MET(1)	MET-ICP	Aluminum	SW846-6010B	0.2	mg/L
		Barium	SW846-6010B	0.004	mg/L
		Beryllium	SW846-6010B	0.0005	mg/L
		Boron	SW846-6010B	0.1	mg/L
		Calcium	SW846-6010B	0.2	mg/L
		Cobalt	SW846-6010B	0.02	mg/L
		Copper	SW846-6010B	0.02	mg/L
		Iron	SW846-6010B	0.05	mg/L
		Lithium	SW846-6010B	0.01	mg/L
		Magnesium	SW846-6010B	0.2	mg/L
		Manganese	SW846-6010B	0.005	mg/L
		Molybdenum	SW846-6010B	0.05	mg/L
		Potassium	SW846-6010B	2	mg/L
		Silver	SW846-6010B	0.02	mg/L
		Sodium	SW846-6010B	0.2	mg/L
		Strontium	SW846-6010B	0.005	mg/L
		Thorium	SW846-6010B	0.2	mg/L
		Vanadium	SW846-6010B	0.02	mg/L
		Zinc	SW846-6010B	0.05	mg/L
	MET-PMS	Antimony	SW846-6020	0.0025	mg/L
		Arsenic	SW846-6020	0.005	mg/L
		Cadmium	SW846-6020	0.0025	mg/L
		Chromium	SW846-6020	0.01	mg/L
		Lead	SW846-6020	0.0005	mg/L
		Nickel	SW846-6020	0.005	mg/L
		Selenium	SW846-6020	0.01	mg/L
		Thallium	SW846-6020	0.0005	mg/L
		Uranium	SW846-6020	0.0005	mg/L
	HG	Mercury	SW846-7470A	0.00005	mg/L
VOC(1)		Acetone	SW846-8260B-UP	10	µg/L
		Acrolein	SW846-8260B-UP	10	µg/L
		Acrylonitrile	SW846-8260B-UP	5	µg/L
	VOC-PDB	Benzene	SW846-8260B-UP	5	µg/L
		Bromochloromethane	SW846-8260B-UP	5	µg/L
	VOC-PDB	Bromodichloromethane	SW846-8260B-UP	5	µg/L

Table B.2 (continued)

Parameter Group [1]	Measurement or Analyte	Analytical Method [2]	Reporting Limit [3]	Units [4]
VOC(1) (continued) VOC-PDB	Bromoform	SW846-8260B-UP	5	µg/L
	Bromomethane	SW846-8260B-UP	5	µg/L
VOC-PDB	2-Butanone	SW846-8260B-UP	5	µg/L
	Carbon disulfide	SW846-8260B-UP	5	µg/L
VOC-PDB	Carbon tetrachloride	SW846-8260B-UP	5	µg/L
VOC-PDB	Chlorobenzene	SW846-8260B-UP	5	µg/L
VOC-PDB	Chloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	2-Chloroethylvinyl ether	SW846-8260B-UP	10	µg/L
VOC-PDB	Chloroform	SW846-8260B-UP	5	µg/L
VOC-PDB	Chloromethane	SW846-8260B-UP	5	µg/L
VOC-PDB	Dibromochloromethane	SW846-8260B-UP	5	µg/L
	1,2-Dibromo-3-chloropropane	SW846-8260B-UP	10	µg/L
	1,2-Dibromoethane	SW846-8260B-UP	5	µg/L
VOC-PDB	Dibromomethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,2-Dichlorobenzene	SW846-8260B-UP	5	µg/L
VOC-PDB	1,4-Dichlorobenzene	SW846-8260B-UP	5	µg/L
	1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
	trans-1,4-Dichloro-2-butene	SW846-8260B-UP	5	µg/L
VOC-PDB	Dichlorodifluoromethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,1-Dichloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,2-Dichloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,1-Dichloroethene	SW846-8260B-UP	5	µg/L
VOC-PDB	cis-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
VOC-PDB	trans-1,2-Dichloroethene	SW846-8260B-UP	5	µg/L
VOC-PDB	1,2-Dichloropropane	SW846-8260B-UP	5	µg/L
VOC-PDB	cis-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
VOC-PDB	trans-1,3-Dichloropropene	SW846-8260B-UP	5	µg/L
	Ethanol	SW846-8260B-UP	200	µg/L
VOC-PDB	Ethylbenzene	SW846-8260B-UP	5	µg/L
	Ethyl methacrylate	SW846-8260B-UP	5	µg/L
	2-Hexanone	SW846-8260B-UP	5	µg/L
	Iodomethane	SW846-8260B-UP	5	µg/L
	4-Methyl-2-pentanone	SW846-8260B-UP	5	µg/L
VOC-PDB	Methylene chloride	SW846-8260B-UP	5	µg/L
	Styrene	SW846-8260B-UP	5	µg/L
	1,1,1,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,1,2,2-Tetrachloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	Tetrachloroethene	SW846-8260B-UP	5	µg/L
VOC-PDB	Toluene	SW846-8260B-UP	5	µg/L
VOC-PDB	Total Xylene	SW846-8260B-UP	5	µg/L
VOC-PDB	1,1,1-Trichloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,1,2-Trichloroethane	SW846-8260B-UP	5	µg/L
VOC-PDB	Trichloroethene	SW846-8260B-UP	5	µg/L
VOC-PDB	Trichlorofluoromethane	SW846-8260B-UP	5	µg/L
VOC-PDB	1,2,3-Trichloropropane	SW846-8260B-UP	10	µg/L
VOC-PDB	1,1,2-Trichloro-1,2,2-trifluoroethane	SW846-8260B-UP	5	µg/L
	Vinyl acetate	SW846-8260B-UP	10	µg/L
VOC-PDB	Vinyl chloride	SW846-8260B-UP	2	µg/L
RAD(1)	Gross Alpha Activity	EPA-900.0	5	pCi/L
	Gross Beta Activity	EPA-900.0	10	pCi/L
RAD(3)	Uranium-234, -235, & -238	Y50-AC-65-7061	0.4	pCi/L
RAD(12)	Technetium-99	Y50-AC-65-7060	15	pCi/L

Table B.2 (continued)

Notes:

1 Elementary Parameter Groups for the Standard Parameter Group and Selected Parameter Monitoring:

FLD	-	Field measurements
CHEM	-	Miscellaneous laboratory analytes (e.g., dissolved solids) and anions
Anions	-	Chloride, Nitrate, and Sulfate
MET(1)	-	Metals
HG	-	Mercury
MET-PMS	-	Metals by method SW846-6020
VOC(1)	-	Volatile organic compounds (54 compounds)
VOC-PDB	-	Volatile organic compounds reported for Passive Diffusion Bag samples (36 compounds)
RAD(1)	-	Gross alpha and gross beta activity
RAD(3)	-	Uranium-234, -235, and -238
RAD(12)	-	Technetium-99

2 Analytical Method:

NA - Not Applicable

Field measurements are performed in accordance with the following B&W Y-12 Management Requirements operating procedures:

Field Measurement	Procedure	Field Measurement	Procedure
Depth to Water	Y50-71-015	Dissolved Oxygen	Y50-71-032
Water Temperature	Y50-71-030, -014	REDOX	Y50-71-033
pH	Y50-71-031, -014	Pressure Profile	Y50-71-019
Conductivity	Y50-71-034, -022		

Analytical methods from:

- EPA - Methods for Chemical Analysis of Water and Wastes (U.S. Environmental Protection Agency 1983)
- SM - Standard Methods for the Evaluation of Water and Wastewater, 18th Edition (American Public Health Association 1992)
- SW846 - Test Methods for Evaluating Solid Waste Physical/Chemical Methods (U.S. Environmental Protection Agency 1996)
- B&W Y-12 ACO Procedures and laboratory test names applicable to the analytical methods shown above in the main table:

Method	ACO Procedure	ACO Lab Test
EPA-353.2	ASO-TP-7659	NO3-N
EPA-900.0	Y50-AC-65-7074	GROSSAP-ENV
SM 2320B 18	Y/P65-7639	ALKALINITY-I
SM 2540C 18	Y-50-AC-65-7914	SOLIDS-TOT-D
SM 2540D 18	Y/P65-7918	SOLIDS-TOT-S
SM 4500F 18	Y/P65-7602	FLUORIDE
SW846-6010B	Y50-AC-65-0040	ICP6010
SW846-6020	Y/P65-0034	ICPMSGW
SW846-7470A	Y50-AC-65-7470	HGLOWRL
SW846-8260B-UP	Y/P65-SW846-8260B	VOA8260GW
SW846-8260B-UP	Y/P65-SW846-8260B	VOAGW-PDB
SW846-9056	Y50-AC-65-7619	ANIONS
Y50-AC-65-7060	Y50-AC-65-7060	TC-99LS-ENV
Y50-AC-65-7061	Y50-AC-65-7061	ASPEC-U

Table B.2 (continued)

Notes: (continued)

3 Reporting Limits:

NA	-	not applicable
VOC(1)	-	Reporting limits are contract-required quantitation limits; also report estimated values (with qualifier) below this limit and above the method detection limit.
RAD(1,3,12)	-	Reporting limits are target minimum detectable activities (MDAs) that may be obtained under optimal analytical conditions; actual MDAs are sample-specific and may vary significantly from the target value.

4 Units:

mg/L	-	milligrams per liter
mV	-	millivolts
NTU	-	nephelometric turbidity units
ppm	-	parts per million
pCi/L	-	picoCuries per liter

APPENDIX C

CY 2009 GROUNDWATER MONITORING SCHEDULES
(Insert When Issued, Before Each Quarterly Sampling Event)

APPENDIX D

ADDENDA TO THE CY 2009 SAMPLING AND ANALYSIS PLAN
(if issued)

APPENDIX E

LABORATORY REQUIREMENTS
(Bottle Lists, Holding Times, Turnaround Time, Elevated Minimum Activity)

CY 2009 SAP BOTTLE LISTS

STD

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions, Fluoride, Carbonate and Bicarbonate	ANIONS, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	ICP6010, ICPMS6020-EXT, HGLOWRL	HNO_3	1 – 500 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO_3	1 – 1 L polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **LIMS LAB TEST ID**

CHEM ALKALINITY-I, ANIONS, NO3-N, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D
MET(1) ICP6010, ICPMS6020-EXT and HGLOWRL
VOC(1) VOA8260GW
RAD(1)GROSSAB-ENV

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

STD-WESTBAY

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions, Fluoride, Carbonate and Bicarbonate	ANIONS, FLUORIDE, ALKALINITY-I	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene
Total Suspended Solids	SOLIDS-TOT-S	None	1 - 250 mL polyethylene
Total Dissolved Solids	SOLIDS-TOT-D	None	1 - 250 mL polyethylene
Total Metals (ICP,ICP-MS, and Hg)	ICP6010, ICPMS6020-EXT, HGLOWRL	HNO_3	1 - 250 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO_3	1 – 500 mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids
Trip Blank (VOA) **(one per cooler)**	VOA8260GW	None	1 - 40 mL amber glass with Teflon lined septum lid

STD: **LIMS LAB TEST ID**

CHEM ALKALINITY-I, ANIONS, NO3-N, FLUORIDE, SOLIDS-TOT-S, SOLIDS-TOT-D
MET(1) ICP6010, ICPMS6020-EXT and HGLOWRL
VOC(1) VOA8260GW
RAD(1)GROSSAB-ENV

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

Anions

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions	ANIONS	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene

Parameter:	**LIMS LAB TEST ID**
Anions	ANIONS
Nitrate	NO3-N

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

Anions, HG, VOC (1)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions	ANIONS	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene
Mercury (Hg)	HGLOWRL	HNO3	1 - 250 mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

Parameter:	**LIMS LAB TEST ID**
Anions	ANIONS
VOC(1)	VOA8260GW

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

Anions, RAD (1,12)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions	ANIONS	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene
Gross Alpha/Beta and Tc-99	GROSSAB-ENV TC99LS-ENV	HNO_3	1 – 1 L polyethylene

Parameters:	**LIMS LAB TEST ID**
Anions	ANIONS
Nitrate	NO3-N
RAD(1)	GROSSAB-ENV
RAD(12)	TC-99LS-ENV

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

Anions, VOC (1)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Anions	ANIONS	None	1 - 250 mL polyethylene
Nitrate	NO3-N	H_2SO_4 to pH < 2; 4^{O}+/-2^{O}	1 – 100 mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

Parameter:	**LIMS LAB TEST ID**
Anions	ANIONS
Nitrate	NO3-N
VOC(1)	VOA8260GW

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

MET-PMS, RAD(1)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
MET-PMS (ICP-MS)	ICPMS6020-EXT	HNO_3	1 - 250 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV	HNO_3	1 – 1 L polyethylene

Parameters: LIMS LAB TEST ID
MET(1) ICPMS6020-EXT
RAD(1)GROSSAB-ENV

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

MET-PMS, RAD(1,3)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
MET-PMS (ICP-MS)	ICPMS6020-EXT	HNO_3	1 - 250 mL polyethylene
Radiochemistry (UV)	GROSSAB-ENV ASPECU-ENV	HNO_3	1 – 1 L polyethylene

Parameters: LIMS LAB TEST ID
MET(1) ICPMS6020-EXT
RAD(1)GROSSAB-ENV
RAD(3)ASPECU-ENV

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

MET-PMS, VOC(1)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
MET-PMS (ICP-MS)	ICPMS6020-EXT	HNO_3	1 - 250 mL polyethylene
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

Parameters:	**LIMS LAB TEST ID**
MET(1)	ICPMS6020-EXT
VOC(1)	VOA8260GW

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

VOC (1)

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

Parameter:	**LIMS LAB TEST ID**
VOC(1)	VOA8260GW

[1]All samples chilled to 4°C +/- 2°C

CY 2009 SAP BOTTLE LISTS

VOC-PDB

Parameter	Lab Tests	Chemical Preservative [1]	Bottle Types/Size
Volatiles	VOA8260GW	None	2 - 40 mL amber glass with Teflon lined septum lids

Parameter:	**LIMS LAB TEST ID**
VOC-PDB	VOAGW-PDB

[1]All samples chilled to 4°C +/- 2°C

ESTABLISHED HOLDING TIMES

Parameter	Holding Times
Alkalinity (Carbonate, Bicarbonate)	14 days
Anions (Chloride, Nitrate, and Sulfate)	28 days
Fluoride	28 days
Mercury	28 days
Metals (ICP, ICPMS)	6 months
Radiochemistry (except tritium)	6 months
Solids, Total Dissolved	7 days
Solids, Total Suspended	7 days
Tritium	No EPA guidance
VOA	7 days

ESTABLISHED TURNAROUND TIMES

The Groundwater Protection Program and the Analytical Chemistry Organization (ACO) laboratory have agreed upon a turnaround time, such that the analytical data generated from each sampling location will be completed within 35 days of receipt. Every two weeks, data that has been approved since the previous two-week period will be transmitted in the form of hard copy of the approved lab reports for each location, along with an electronic copy in a standardized and compatible format (please see the most recent version of the *Y-12 Plant Groundwater Protection Program Data Management Plan*).

ELEVATED MINIMUM DETECTABLE ACTIVITY

Groundwater samples with high TDS (>1,000 mg/L) typically have elevated minimum detectable activities (MDAs) for gross alpha (> 15 pCi/L) and gross beta (> 50 pCi/L). However, the MDAs for specific isotopic analyses are unaffected by the sample solid content. For samples with gross activity results that are less than an elevated MDA, and specific isotopic analyses have not been requested, the laboratory will issue a request to analyze for the principal alpha- or beta-emitting isotopes. That is, if the gross alpha MDA exceeds 15 pCi/L and the result is less than 15 pCi/L, then the laboratory will request analyses of isotopic uranium (by method Y/P65-7061). Similarly, if a sample has an elevated gross beta MDA (>50 pCi/L) and the result is less than the MDA, then the laboratory would request analysis of technetium-99 activity. These requests will be approved by the Y-12 Groundwater Protection Program manager, or designee, before analyses are performed.

APPENDIX F

SAMPLING FREQUENCY FOR MONITORING WELLS DURING CY 2009

Appendix F. Sampling Frequencies for Monitoring Wells during CY 2009

Well	Regime [1]	Sampling Frequency [2]			
		MAROS Baseline	GWPP MOP	MAROS Supplement	GWPP CY 2009
55-2A	EF	-	Semiannual	Biennial	Odd
55-2B	EF	Semiannual	Semiannual	Annual	Annual
55-2C	EF	Annual	Annual	Annual	Annual
55-3A	EF	-	Semiannual	Semiannual	Semiannual
55-3B	EF	-	Semiannual	Semiannual	Semiannual
55-3C	EF	-	Semiannual	Semiannual	Semiannual
56-1A	EF	-	Semiannual	Annual	Annual
56-1C	EF	-	TBD	-	Annual
56-2A	EF	Review	Annual	Annual	Annual
56-2B	EF	Review	Annual	Annual	Annual
56-2C	EF	Annual	Annual	Annual	Annual
56-3A	EF	-	Semiannual	Annual	Annual
56-3B	EF	-	Semiannual	Annual	Annual
56-3C	EF	-	Semiannual	Annual	Annual
56-4A	EF	-	Semiannual	Annual	Annual
GW-014	BC	Semiannual	Semiannual	Semiannual	Annual
GW-053	BC	Biennial	Odd	Biennial	Odd
GW-058	BC	Review	Odd	Biennial	Odd
GW-065	BC	-	TBD	-	Semiannual
GW-068	BC	Review	Even	Semiannual	Annual
GW-071	BC	Semiannual	Semiannual	Semiannual	Semiannual
GW-082	BC	Semiannual	Annual	Annual	Annual
GW-085	BC	Semiannual	Semiannual	Annual	Annual
GW-098	BC	Annual	Annual	Annual	Annual
GW-100	BC	Annual	Odd	Annual	Annual
GW-101	BC	Annual	Odd	Annual	Annual
GW-122	BC	Review	Annual	Eliminate	Odd
GW-127	BC	Annual	Odd	Eliminate	Odd
GW-153	EF	Annual	Annual	Regulated	Annual
GW-174	CR	Review	Odd	Biennial	Odd
GW-175	CR	Annual	Even	Biennial	Odd
GW-176	CR	Review	Odd	Biennial	Odd
GW-180	CR	Review	Odd	Biennial	Odd
GW-204	EF	Biennial	Annual	Biennial	Annual
GW-219	EF	-	Odd	REG?	Odd
GW-220	EF	-	Semiannual	Regulated	Semiannual
GW-222	EF	Annual	TBD	Annual	2009
GW-225	BC	Semiannual	Semiannual	Semiannual	Annual
GW-229	BC	Annual	Annual	Annual	Annual
GW-236	BC	Annual	Odd	Eliminate	Odd
GW-240	EF	Annual	Annual	Annual	Annual
GW-242	BC	Review	TBD	Annual	Annual
GW-246	BC	Semiannual	Semiannual	Annual	Odd
GW-251	EF	Annual	Annual	Annual	Annual
GW-269	EF	Review	Semiannual	Every 5 years	Annual
GW-270	EF	Review	Odd	Eliminate	Odd
GW-272	EF	Review	Odd	Annual	Odd
GW-274	EF	Annual	Annual	Annual	Annual
GW-275	EF	Annual	Annual	Annual	Annual
GW-289	BC	Semiannual	Annual	Annual	Annual
GW-307	BC	Review	Odd	Annual	Annual
GW-315	BC	Annual	Annual	Annual	Annual
GW-322	CR	Review	Even	Annual	Annual

Appendix F. Sampling Frequencies for Monitoring Wells during CY 2009

Well	Regime [1]	Sampling Frequency [2]			
		MAROS Baseline	GWPP MOP	MAROS Supplement	GWPP CY 2009
GW-332	EF	Annual	Annual	Annual	Annual
GW-337	EF	Annual	Annual	Annual	Annual
GW-365	BC	Review	Even	Annual	Annual
GW-381	EF	-	Annual	Regulated	Annual
GW-383	EF	-	Semiannual	Regulated	Annual
GW-505	EF	Review	Odd	Biennial	Odd
GW-508	EF	-	TBD	Every 5 years	Odd
GW-526	BC	-	TBD	Annual	Annual
GW-537	BC	Annual	Annual	Annual	Annual
GW-601	BC	Review	Odd	Semiannual	Annual
GW-615	BC	Semiannual	Annual	Eliminate	Annual
GW-616	BC	Annual	Annual	Annual	Annual
GW-623	BC	Review	TBD	Semiannual	Annual
GW-627	BC	Semiannual	Semiannual	Semiannual	Semiannual
GW-629	BC	Biennial	Even	Semiannual	Semiannual
GW-633	EF	Biennial	Even	Annual	Annual
GW-648	BC	Remove	TBD	Eliminate	Semiannual
GW-653	BC	Annual	Annual	Semiannual	Annual
GW-656	EF	Annual	Annual	Biennial	Annual
GW-686	EF	Review	Semiannual	Annual	Annual
GW-690	EF	Annual	Annual	Annual	Annual
GW-691	EF	Annual	Annual	Semiannual	Semiannual
GW-692	EF	Remove	Annual	Annual	Annual
GW-698	EF	Semiannual	Semiannual	Semiannual	Semiannual
GW-700	EF	Annual	Annual	Annual	Annual
GW-703	BC	Annual	Annual	Annual	Annual
GW-722-14	EF	-	Annual	-	Annual
GW-722-17	EF	-	Annual	-	Annual
GW-722-20	EF	-	Annual	-	Annual
GW-722-22	EF	-	Annual	-	Annual
GW-722-33	EF	-	Annual	-	Annual
GW-724	BC	Annual	Annual	Annual	Annual
GW-725	BC	Annual	Annual	Annual	Annual
GW-726-02	BC	-	TBD	-	2009
GW-726-04	BC	-	TBD	-	2009
GW-726-06	BC	-	TBD	-	2009
GW-726-09	BC	-	TBD	-	2009
GW-726-12	BC	-	TBD	-	2009
GW-726-16	BC	-	TBD	-	2009
GW-726-20	BC	-	TBD	-	2009
GW-726-23	BC	-	TBD	-	2009
GW-735	EF	Biennial	Odd	Annual	Odd
GW-738	BC	Annual	Annual	Annual	Annual
GW-740	BC	Annual	Annual	Annual	Annual
GW-744	EF	-	Annual	Regulated	Annual
GW-747	EF	-	Annual	Regulated	Annual
GW-750	EF	Biennial	Odd	Biennial	Odd
GW-763	EF	Annual	Annual	Annual	Annual
GW-765	EF	Biennial	Odd	Biennial	Odd
GW-769	EF	Semiannual	Semiannual	Semiannual	Semiannual
GW-770	EF	Semiannual	Semiannual	Semiannual	Annual
GW-775	EF	Biennial	Odd	Biennial	Odd
GW-776	EF	Biennial	Odd	Biennial	Odd
GW-779	EF	Remove	TBD	Biennial	Odd

Appendix F. Sampling Frequencies for Monitoring Wells during CY 2009

Well	Regime [1]	Sampling Frequency [2]			
		MAROS Baseline	GWPP MOP	MAROS Supplement	GWPP CY 2009
GW-781	EF	Annual	Annual	Annual	Annual
GW-782	EF	Annual	Annual	Annual	Annual
GW-783	EF	Annual	Annual	Annual	Annual
GW-791	EF	Annual	Annual	Annual	Annual
GW-816	EF	-	Annual	Regulated	Annual
GW-820	EF	Semiannual	Semiannual	Annual	Annual
GW-959	EF	-	Annual	Annual	Odd
GW-960	EF	-	TBD	Annual	Odd

Appendix F. Sampling Frequencies for Monitoring Wells during CY 2009

Notes:

1. Regime

BC = Bear Creek Hydrogeologic Regime
CR = Chestnut Ridge Hydrogeologic Regime
EF = Upper East Fork Poplar Creek Hydrogeologic Regime

2. Sampling frequency

MAROS Baseline = recommendation in the initial assessment of the Y-12 Groundwater Protection Program using the Monitoring and Remediation Optimization System (MAROS) (BWXT 2005)

GWPP MOP = as specified in the Y-12 Groundwater Protection Program Monitoring Optimization Plan (BWXT 2006a)

MAROS Supplement = recommendation in the supplemental MAROS assessment of the Y-12 Groundwater Protection Program (Babcock & Wilcox Technical Services Y-12, LLC 2008)

GWPP CY 2009 = the updated sampling frequency for use beginning in CY 2009

Semiannual = Sample collection twice per year
Annual = Sample collection once per year
Odd = Sample collection every other year, starting in 2009
2009 = Sample collection in 2009, every five years thereafter
"-" = Omitted from the MAROS assessment; lack of data or multiple vertical sampling points
Even = Sample collection every other year, starting in 2006
Regulated = Location is listed in a permit or decision document, but is not currently monitored by another program
Review = Sample collection every other year, starting in 2009
TBD = To be determined

Note: GWPP CY 2009 sampling frequency is shaded if differs from the MAROS Supplement recommendation. Final frequency reflects additional review of the MAROS supplement assessment.

APPENDIX G

MANAGEMENT OF PURGED GROUNDWATER

APPENDIX G.1

WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN
for
Waste Streams generated from
Y-12 Groundwater Protection Program
Sampling Activities

Date Issued – 12/18/06

prepared by:

Y-12 Groundwater Protection Program
Environmental Compliance Department
Y-12 National Security Complex
P.O. Box 2009
Oak Ridge, TN 37831

managed by:

BWXT Y-12, LLC

for the:

U.S. Department of Energy
Under Contract Number:

DE-AC05-00OR22800

This document has been reviewed by a Y-12 DC/ UCNI RO and has been determined to be UNCLASSIFIED and contains no UCNI. This review does not constitute clearance for Public Release.

Name: L. W. McMahon [signature on file]

Date: 12/18/06

Approvals

Don Bohrman [signature on file] 12/18/06
Don Bohrman Date
BWXT Y-12, LLC
Environmental Officer

Mary Wiginton [signature on file] 12/18/06
Mary Wiginton Date
BWXT Y-12, LLC
Waste Engineer

Tom Conrad for D. McCune [signature on file] 12/18/06
Dave McCune Date
Bechtel Jacobs, LLC
Waste Treatment Operations

Mark Burris [signature on file] 12/18/06
Brad E Skaggs or Mark S. Burris Date
BWXT Y-12, LLC
Environmental Compliance

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
Purge water[2] that is not contained	Non-hazardous, non-radiological contaminated waters. Analytical results indicate constituents in the water are less than Safe Drinking Water Act Maximum Contaminant Levels (MCL). In addition, historical knowledge of relevant groundwater plumes at the Y-12 National Security Complex confirm the non-detection of contaminants, or the detection of contaminants (J values), but still below the MCL. See the most current GWPP Groundwater Monitoring Data Compendium	Not contained	Not contained	ACO technicians will dispense/dispose of waters directly to ground surface at the well location.

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
SID[1] 2212 purge water [2] (non-regulated and non-hazardous purge water)	Non-hazardous, contaminated waste waters. Analytical results indicate concentration in the water exceed the MCL. These waters can contain nitrate concentration > 100 mg/L, Uranium >0.03 mg/L, and Uranium isotopes > 4% of DCG. Waters commonly contain the following typical halogenated compounds (not inclusive) that exceed the MCL, but are below RCRA TCLP levels, include: Tetrachloroethene, Trichloroethene, cis-1,2-Dichloroethene, Carbon Tetrachloride, 1,1-Dichloroethane, Methylene Chloride, and Vinyl Chloride. Other radioisotopes present consist of Tc-99 and daughter products of Uranium. Although not regulated, this waste water is contained, handled, and sent for disposal as a Best Management Practice (BMP) at Y-12. As a BMP, this contaminated purge water is not place on clean surfaces (soils) or near surface water tributaries. Annual groundwater data evaluation, multiple sampling event, and groundwater plume characteristics provide ample evidence of this classification.	Segregate non-regulated waste waters from other GWPP waste waters that contain a RCRA hazardous waste (SID 2214 and 2216). Waste streams[1] have been characterized and established per well location and are published in GWPP's annual GWPP Sampling and Analysis Plan. Waters can be combined and bulk as necessary in a DOT approved container.	Place in a DOT approved container. The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01 Label containers in accordance with Y71-310, *Waste Container Labeling*	SID 2212 waste stream meets the waste acceptance criteria of Master Profile WW-01. Sampling data is used to complete Attachment G of UCN 2109. If Uranium is present, above detection levels, then a wt %U235 sample is required to determine enrichment, and a duplicate sample is required if results are >0.93 wt U235. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence of constituents seen in SID 2212 waters and the absence of other such constituents. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations. Depending on enrichment content, normal disposal would be at either the West End Treatment Facility (WETF) or the Central Pollution Control Facility (CPCF).

Waste Management Plan for Y-12 Groundwater Protection Program Sampling Activities

12/18/06

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
SID[1] 2214 purge water[2] (purge water from multiple F-listed RCRA groundwater wells, along with rinse waters from sampling equipment and disposables, bulked into the same drum. All waste water carries the F039 waste code).	Hazardous waste waters (no radiological contaminants). Characterization based upon well location. Wells located down-gradient of the Bear Creek Burial Grounds between north tributary (NT) 6 and NT 8, and north of Bear Creek. Purge water most likely contains leachate from the BCBGs and is considered RCRA F-listed (40 CFR Part 261.31) based on established documentation (F039 leachate is comprised of F codes: F001, F002, F004, and F005). Typical halogenated volatile organic compounds detected in the SID 2214 waters, which are above the MCL include: Tetrachloroethene, Trichloroethene, 1,2-Dichloroethene, 1,1-Dichloroethene, 1,1,1-Trichloroethane, 1,1-Dichloroethane, Methylene Chloride, and Vinyl Chloride. Typically Benzene and other total petroleum hydrocarbons have also been identified.	Segregate RCRA F-listed waste waters from non-regulated waste waters (SID 2212) and RCRA Characteristic waste waters (SID 2216). Waste waters are bulked/accumulated at RCRA Satellite Accumulation Area (SAA) #SA-993, under the direction of the SAA Operator or Alternate Operator	Place in a DOT approved container. Waste is transported as DOT Class 9 under a Bill of Lading listing the assigned EPA waste code. Transporter has received DOT training. The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01 Label containers in accordance with Y71-310, *Waste Container Labeling*	Send SID 2214 waste waters to 90-Day Yard for further management. **RCRA F-listed waste are prohibited under Master Profile WW-01,** except under special arrangement with DOE, or approved by Waste Treatment Coordinator for waste that can be treated at CPCF or Groundwater Treatment Facility (GWTF). SID 2214 waste waters have been approved for treatment at GWTF with the following prohibitions: waters with Uranium above detection (based on waste sample analyses) and Nitrates in concentration > 100 mg/L. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence and absence of WW-01 constituents seen in SID 2214 waters. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations.

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
SID[1] 2216 purge water[2] (purge water from multiple RCRA characteristic wells bulked into the same drum. The EPA waste code is dependent on the well location).	Hazardous waste waters (mixed and non-radiological contaminated). Analytical results indicate that concentrations exceed a RCRA Toxicity Contaminant Leaching Procedure (TCLP - 40 CFR Part 261.24). Annual groundwater data evaluation, plume evaluations, and repeated sampling events give weighted evidence to this classification (wells may receive this classification if concentrations have been consistently approaching the RCRA TCLP levels). SID 2216 waste water can contain the following EPA waste codes: D005 – Barium D006 - Cadmium D018 – Benzene D019 – Carbon Tetrachloride D029 – 1,1-Dichloroethene D039 – Tetrachloroethene D040 – Trichloroethene D043 – Vinyl Chloride In addition to the above, these waters may contain the following volatile organic compounds: 1,2-Dichloroethene, 1,1,2-Trichloro-1,2,2-triflouroethane, 1,1,1-Trichloroethane, 1,1-Dichloroethane, Acetone, Methylene Chloride, Chloroform and other total petroleum hydrocarbons. These waters may can contain trace metals, nitrate concentration > 100 mg/L, Uranium >0.03 mg/L, Uranium isotopes > 4% of DCG, and other radioisotopes (Tc99 and daughter products of Uranium).	Segregate RCRA characteristic waste waters from non-regulated waste waters (SID 2212) and RCRA F-listed waste waters (SID 2216). RCRA characteristic waste waters are bulked/accumulated at RCRA Satellite Accumulation Area (SAA) #SA-992, under the direction of the SAA Operator or Alternate Operator	Place in a DOT approved container. Waste is transported as DOT Class 9 under a Bill of Lading listing the assigned EPA waste code. Transporter has received DOT training. The above containers are compatible with the purge water and meet packaging requirements specified in Master Profile WW-01 Label containers in accordance with Y71-310, *Waste Container Labeling*	Send SID 2216 waste waters to 90-Day Yard for further management. SID 2216 waste waters meet the waste acceptance criteria of Master Profile WW-01. Waters with Uranium above detection (based on waste sample analyses) require a wt %U235 sample to determine enrichment and a duplicate sample is required if results are >0.93 wt U235. Nitrates concentration > 10 mg/L must be indicated. All other constituents listed in WW-01 have been quantified through current analytical results, previous analyses, historical data (prior to 1996), and groundwater plume composition. A Process Knowledge form attached to each UCN 2109 documents the presence and absence of WW-01 constituents seen in SID 2216 waters. This waste stream is disposed at Y-12 National Security Complex's onsite treatment facility with authorization from Waste Treatment Operations. Depending on enrichment content, waste waters are disposed at the West End Treatment Facility (WETF) or the Central Pollution Control Facility (CPCF).

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
Disposables and sampling equipment in contact with RCRA characteristic or F-listed purge water: **Sampling equipmen**t: includes sample pumps, tubing, sample trays, and flow-through cells (all components). These items meet the definition of a "container" under RCRA. **Non-absorbent disposables –** include: gloves, plastic bags, and instrument probes **Absorbent disposables** – includes paper towels, wipes, clothes, litmus paper. **During normal sampling operations these items should not come into contact with RCRA characteristic or F-listed waste waters.**	Non-hazardous solid waste and RCRA empty containers. The sampling equipment and disposables which comes in contact with RCRA purge waters **will not be subject to RCRA if:** **1)** The waste can be sufficiently removed from non-absorbent material (disposables), such as nitrile gloves, plastic surfaces, instrument probes, and external surfaces of sample bottles by rinsing such items. All rinse water must be collected and bulked under the appropriate RCRA waste stream (SID 2216 or 2214). **2)** Sampling equipment that meets the definition of a "container" under RCRA and is **not subject to regulation once the container is "empty" as defined under 40 CFR Part 261.7, paragraph (b).** To meet this requirement all fluids must be sufficiently drained from the equipment, by normal means as possible, and then rinsed at least once to remove residue. All rinse water must be collected and bulked under the appropriate RCRA waste stream (SID 2216 or 2214). **3)** Absorbent disposable such as wipes, paper towels, or clothes that are use to remove/clean/dry any addition liquids/residues RCRA empty containers, once the items are rinsed, are also not subject to RCRA. Litmus paper, if used for its intended purpose, and does not come into contact with F039 waste water, is also not subject to RCRA.	**Segregate non-regulated waste streams from those items subject to RCRA. all** **Sampling equipment:** can be reused as necessary for the multiple sampling events and are not regulated. **Non-absorbent disposables –** once rinsed are not regulated. **Absorbent disposables** –. Items used to wipe/dry/clean RCRA empty containers are not regulated and can also be disposed of into sanitary trash (profile S-020). **If these items do come into contact with RCRA waste water,** the items are subject to regulation. These items must be wrung out as much as possible (water collected) and segregated from non-regulated items.	**ALL non-regulated items** – dispose of into the appropriate sanitary waste receptacle or dumpster, as specified under Master Profile S-020. **Any items subject to RCRA regulation** must be place in a DOT approved container and labeled in accordance with procedure Y71-310, *Waste Container Labeling.* Waste is transported as DOT Class 9 under a Bill of Lading, listing the assigned EPA waste code, to the 90-Day Yard for further management. Transporter has received DOT training.	**All the items listed below require authorization from Y-12 Waste Management prior to disposal in Sanitary Trash** **Sampling equipment** – once the item is no longer of use, or can no longer be used, the item can be disposed of in sanitary trash (Waste Profile No. S-020). **Non-absorbent disposables –** after items are rinsed, collect the rinse solution and bulk with SID 2216 or 2214 purge water, and then dispose of the item in sanitary trash (S-020). **Absorbent disposables – not subject to regulation can** be disposed into sanitary trash (S-020). **Absorbent material that comes into contact with RCRA Characteristic (SID 2216) purge water,** by process knowledge the whole material if tested under the TCLP would not exceed TCLP levels, and therefore the item can be disposed into sanitary trash (S-020). **Absorbent material that** c**omes into contact with RCRA F-listed waste** waters (SID 2214) will be subject to regulation and must be send to the 90-Day Yard for further management (Master Profile HW-01). Final disposal path will be determined by Navarro-GEM to an off-site RCRA TSD.

Waste stream	Characterization[3]	Segregation Requirements	Packaging	Disposal Path
All disposables and equipment used for GWPP purposes (non F-listed wells): Sampling pumps, gloves, wipes, tubing, litmus paper, instrument probes, sample trays, and flow-through cells.	Non-hazardous solid waste. Characterization is not required.	Segregate F-listed contaminated items from non F-listed contaminated items.	N/A	Items not in contact with any F-listed purge water can be disposed in sanitary trash (profile S020) with authorization from Y-12 Waste Management. All sampling equipment is to be reused till the item is no longer of use and then disposed of in sanitary trash. All Sanitary waste placed in the approved on-site Solid Waste Disposal Facility (Industrial Landfill)
Waters/Fluids generated during well development of existing wells (well development is performed on an as needed basis, prior to sampling, to maintain groundwater flow to well. Five to 10 well casing volumes are generated)	Well development of existing wells will utilize the most recent sampling analytical results and will follow the three waste streams (SIDs) for purge water.	Segregate water based on the three existing waste streams for purge water	Based on volume and waste stream ID number. Containers could consist of drums, polytanks, or tankers.	See the three purge water waste streams IDs above

[1] "SID" – "Stream Identification Number" are the pre-established waste streams identification (ID) for purge waters generated at Y-12. These waste streams were established by Y-12 Waste Operations, prior to 1995, and have been utilized to segregate waste waters. The waste stream ID is established for the coming Calendar Year (CY) for each well location to be monitored; based upon characterization of the most recent sampling results for that well location. These are published an appendix to GWPP's annual Sampling and Analysis Plan (published 2-3 months prior the start of the CY), and the waste stream is established for any other wells added during that CY and documented in addenda to this plan.

[2] "Purge Water" – unusable portion of groundwater purged from a well prior to sample collection. Water is in a liquid form,(99.9% liquid) with normally < 100 mg/L of suspended solids. Water contains contaminants that are in solution (dissolved phase) with little sediment load.

[3] Analytical results (past and present) from sampling events are used to characterize purge water. The GWPP uses a standardized parameter list for every sample, which includes:

1. ICP metals (SW846- EPA 6010B), ICPMS metals (EPA-200.8), Mercury (SW846 – 7470) – includes Uranium metal (0.0005 mg/L)
2. Anions – Alkalinity, Chloride, Fluoride, Nitrates, Sulfates
3. Volatile Organic Compound – SW846 – EPA 8260B
4. Gross Alpha and Gross Beta (EPA-900.0)

The following radioisotopes have been analyzed for on an as needed basis: Tritium, Tc-99, Isotopic Uranium, Total Uranium and wt% U235, and other heavy radioisotopes (Am241, Np 237, I129, Thorium, Radium).

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Waste Identification Tag (UCN 2114B)
for SID 2212 purge water

SID 2212

WASTE IDENTIFICATION

TO BE COMPLETED BY REQUESTER

2109 NUMBER: UCN 2109#

DISPOSAL FORM DATE: Start date of drum

LLW START DATE: "N/A"

MATERIAL DESCRIPTION: Purged groundwater from multiple wells. All water is under waste stream SID 2212

TYPE AND SIZE OF CONTAINER (for example, 55-gallon steel drum): 55-gallon poly drum

LOCATION OF MATERIAL: 9108

DEPARTMENT: 50001328 / Y-12 ECD

SIGNATURE: Signature / date

TO BE COMPLETED BY PLANT DISPOSAL COORDINATOR

CHECKED BY | DATE

COMMENTS: Barcode #

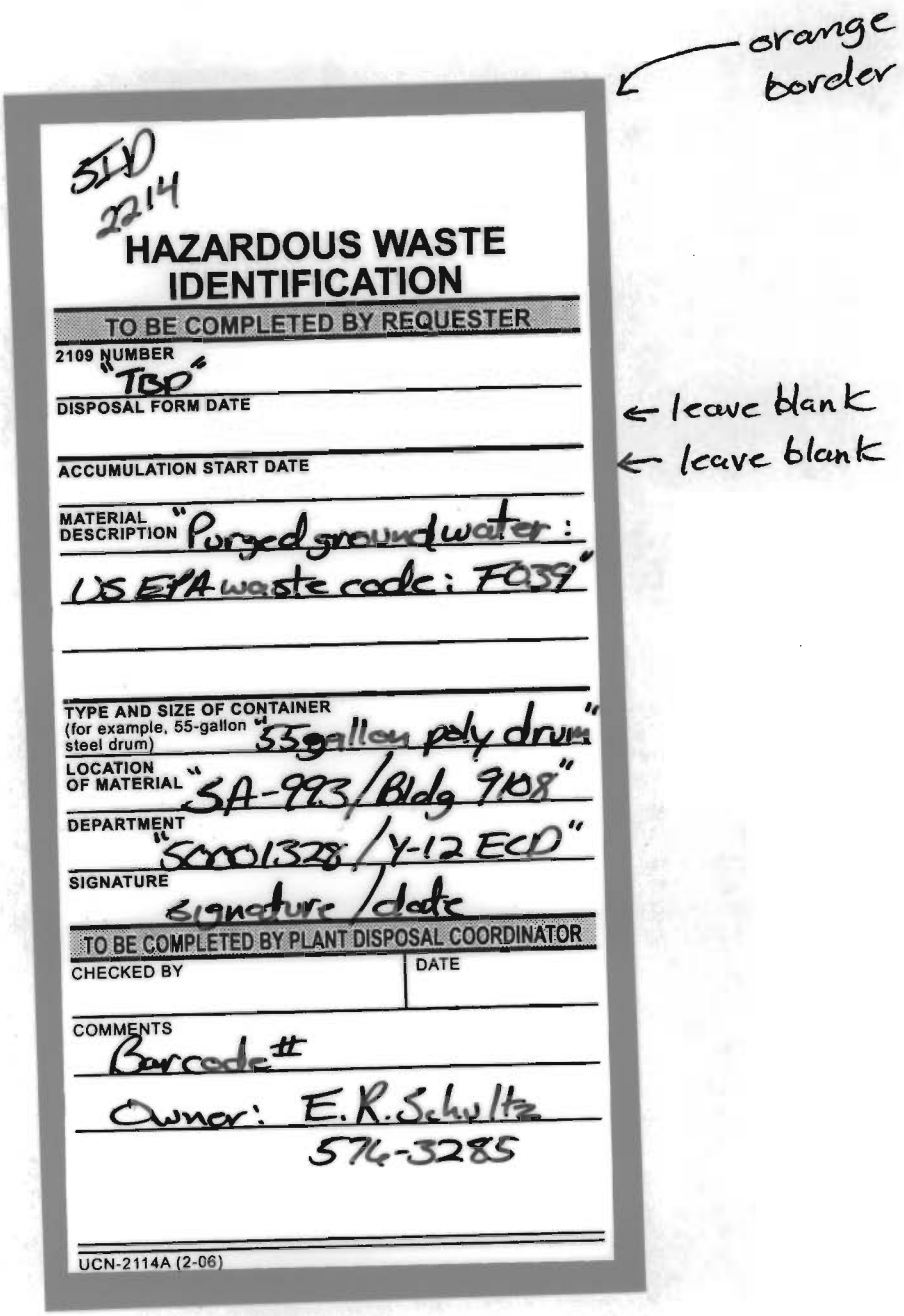
Owner: ER Schultz
574-3285

UCN-2114B (11-05)

APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

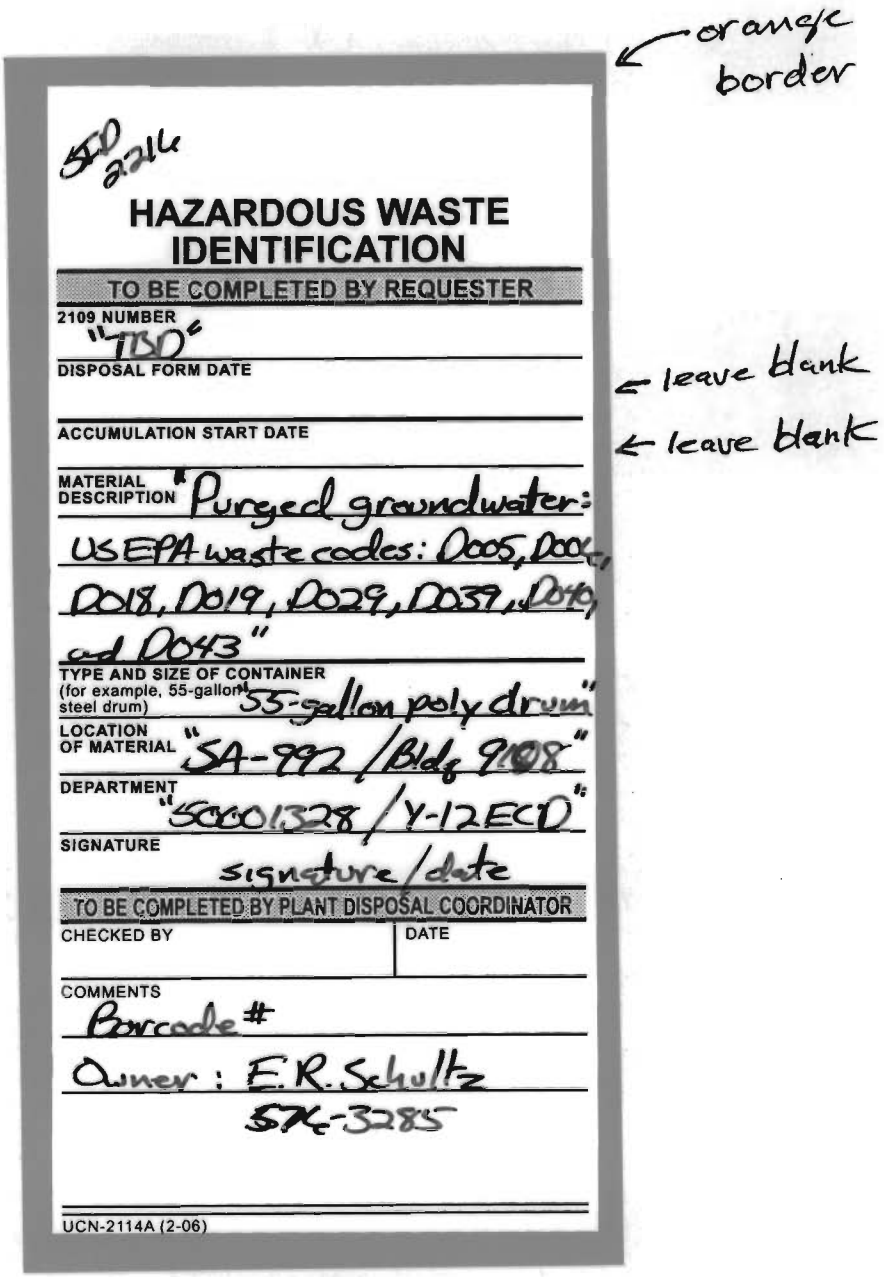
Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2214 purge water



APPENDIX G

Y-12 GWPP PURGE WATER MANAGEMENT

Example of Hazardous Waste Identification Tag (UCN 2114A)
for SID 2216 purge water



APPENDIX G.2

WASTE STREAM IDENTIFICATION FOR PURGED GROUNDWATER

Table G.2. Waste stream identification (SID) and RCRA waste code for groundwater purged from wells to be sampled during CY 2009

Regime	CY 2009 Locations	CY 2009 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
Bear Creek	GW-014	Q1	***SID 2214***	**F039**
	GW-053	Q1	SID 2212	.
	GW-058	Q1	SID 2212	.
	GW-065	Q1, Q3	SID 2212	.
	GW-068	Q1	***SID 2214***	**F039**
	GW-071	Q1, Q3	***SID 2214***	**F039**
	GW-082	Q3	***SID 2214***	**F039**
	GW-085	Q1	SID 2212	.
	GW-098	Q1	SID 2212	.
	GW-100	Q1	SID 2212	.
	GW-101	Q1	SID 2212	.
	GW-122	Q1	SID 2212	.
	GW-127	Q1	NOT CONTAINED	.
	GW-225	Q1	SID 2212	.
	GW-229	Q1	SID 2212	.
	GW-365	Q1	SID 2212	.
	GW-236	Q1	SID 2212	.
	GW-242	Q1	***SID 2214***	**F039**
	GW-246	Q3	SID 2212	.
	GW-289	Q3	***SID 2214***	**F039**
	GW-307	Q1	SID 2212	.
	GW-315	Q1	SID 2212	.
	GW-526	Q1	SID 2212	.
	GW-537	Q3	SID 2212	.
	GW-601	Q1	SID 2212	.
	GW-615	Q1	**SID 2216**	**D005**
	GW-616	Q3	SID 2212	.
	GW-623	Q1	***SID 2214***	**F039**
	GW-627	Q1, Q3	***SID 2214***	**F039**
	GW-629	Q1, Q3	***SID 2214***	**F039**
	GW-648	Q1, Q3	SID 2212	.
	GW-653	Q1	***SID 2214***	**F039**
	GW-703	Q1	SID 2212	.
	GW-724	Q1	SID 2212	.
	GW-725	Q1	SID 2212	.
	GW-726-02	Q2	NOT CONTAINED	.
	GW-726-04	Q2	NOT CONTAINED	.
	GW-726-06	Q2	NOT CONTAINED	.
	GW-726-09	Q2	NOT CONTAINED	.
	GW-726-12	Q2	NOT CONTAINED	.
	GW-726-16	Q2	NOT CONTAINED	.
	GW-726-20	Q2	NOT CONTAINED	.
	GW-726-23	Q2	NOT CONTAINED	.
	GW-738	Q1	SID 2212	.
	GW-740	Q1	SID 2212	.
Chestnut Ridge	GW-174	Q4	NOT CONTAINED	.
	GW-175	Q4	SID 2212	.
	GW-176	Q4	SID 2212	.
	GW-180	Q4	SID 2212	.
	GW-322	Q4	SID 2212	.

Table G.2. (continued)

Regime	CY 2009 Locations	CY 2009 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
East Fork	55-2A	Q4	SID 2212	.
	55-2B	Q4	SID 2212	.
	55-2C	Q4	SID 2212	.
	55-3A	Q2, Q4	**SID 2216**	**D039, D040**
	55-3B	Q2, Q4	**SID 2216**	**D039, D040, D043**
	55-3C	Q2, Q4	**SID 2216**	**D039, D040, D043**
	56-1A	Q3	NOT CONTAINED	.
	56-1C	Q3	NOT CONTAINED	.
	56-2A	Q3	SID 2212	.
	56-2B	Q3	**SID 2216**	**D039**
	56-2C	Q3	**SID 2216**	**D039, D040**
	56-3A	Q3	SID 2212	.
	56-3B	Q3	SID 2212	.
	56-3C	Q3	SID 2212	.
	56-4A	Q2	SID 2212	.
	GW-153	Q4	NOT CONTAINED	.
	GW-204	Q2	SID 2212	.
	GW-219	Q2	SID 2212	.
	GW-220	Q2, Q4	**SID 2216**	**D019**
	GW-222	Q2	SID 2212	.
	GW-240	Q4	SID 2212	.
	GW-251	Q2	SID 2212	.
	GW-269	Q2	SID 2212	.
	GW-270	Q2	SID 2212	.
	GW-272	Q2	SID 2212	.
	GW-274	Q2	**SID 2216**	**D039**
	GW-275	Q2	**SID 2216**	**D005**
	GW-332	Q2	**SID 2216**	**D039**
	GW-337	Q2	**SID 2216**	**D039, D040**
	GW-381	Q4	SID 2212	.
	GW-383	Q4	SID 2212	.
	GW-505	Q2	SID 2212	.
	GW-508	Q2	**SID 2216**	**D018**
	GW-633	Q2	**SID 2216**	**D018**
	GW-656	Q2	**SID 2216**	**D040**
	GW-686	Q2	SID 2212	.
	GW-690	Q2	SID 2212	.
	GW-691	Q2, Q4	**SID 2216**	**D039**
	GW-692	Q2	SID 2212	.
	GW-698	Q2, Q4	**SID 2216**	**D040**
	GW-700	Q3	SID 2212	.
	GW-722-14	Q3	SID 2212	.
	GW-722-17	Q3	SID 2212	.
	GW-722-20	Q3	SID 2212	.
	GW-722-22	Q3	SID 2212	.
	GW-722-33	Q3	NOT CONTAINED	.
	GW-735	Q3	NOT CONTAINED	.
	GW-744	Q3	NOT CONTAINED	.
	GW-747	Q3	NOT CONTAINED	.
	GW-750	Q2	NOT CONTAINED	.

Table G.2. (continued)

Regime	CY 2009 Locations	CY 2009 Sampling Qtr	Waste Stream ID (SID #)	RCRA Waste Code
East Fork (continued)	GW-763	Q4	NOT CONTAINED	.
	GW-765	Q2	NOT CONTAINED	.
	GW-769	Q2, Q4	SID 2212	.
	GW-770	Q4	SID 2212	.
	GW-775	Q3	NOT CONTAINED	.
	GW-776	Q3	NOT CONTAINED	.
	GW-779	Q3	NOT CONTAINED	.
	GW-781	Q3	NOT CONTAINED	.
	GW-782	Q3	SID 2212	.
	GW-783	Q3	SID 2212	.
	GW-791	Q3	SID 2212	.
	GW-816	Q3	NOT CONTAINED	.
	GW-820	Q2	**SID 2216**	**D039, D040**
	GW-959	Q2	NOT CONTAINED	.
	GW-960	Q2	NOT CONTAINED	.

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